

DOCUMENT RESUME

ED 117 189

95

TM 005 049

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TITLE Evaluation of Instructional Materials. TM Report 45.
INSTITUTION ERIC Clearinghouse on Tests, Measurement, and Evaluation, Princeton, N.J.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
REPORT NO ERIC-TM-45
PUB DATE Oct 75
CONTRACT NIE-C-400-75-0015
NOTE 12p.
AVAILABLE FROM ERIC Clearinghouse on Tests, Measurement, and Evaluation, Educational Testing Service, Princeton, N.J. 08540 (free while supplies last)

EDRS PRICE MF-\$0.76 HC-\$1.58 Plus Postage
DESCRIPTORS Content Analysis; Curriculum Design; *Evaluation; *Evaluation Methods; Information Dissemination; Instructional Design; *Instructional Materials; Open Education; Rating Scales
IDENTIFIERS Individually Guided Education

ABSTRACT

This paper examines the evaluation of instructional materials from three viewpoints. First, an analytic system is described which has been found useful by practitioners and researchers for examining the instructional design of materials. This system can contribute to selection among competing materials and to improved use of materials in the teaching-learning process. It is suggested that instructional materials be examined for the quality and completeness of their instructional design and their compatibility (fit) with the curriculum design of the school. Second, a broader system is described which holds promise of analyzing, developing, and maintaining a reference file on the thousands of instructional products now on the market. Schools would be able to retrieve from the reference file information on the particular instructional design constructs of materials. Third, the significance of materials evaluation in meeting the goals of two different curriculum designs is discussed. A selected analysis of the literature and the major emphases in materials evaluation is presented. (Author)

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EDUCATIONAL TESTING SERVICE, PRINCETON, NEW JERSEY 08540

TM REPORT 45

OCTOBER 1975

EVALUATION OF INSTRUCTIONAL MATERIALS

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ABSTRACT

This paper examines the evaluation of instructional materials from three viewpoints. First, an analytic system is described which has been found useful by practitioners and researchers for examining the instructional design of materials. This system can contribute to selection among competing materials and to improved use of materials in the teaching-learning process. It is suggested that instructional materials be examined for the quality and completeness of their instructional design and their compatibility (fit) with the curriculum design of the school. Second, a broader system is described which holds promise of analyzing, developing, and maintaining a reference file on the thousands of instructional products now on the market. Schools would be able to retrieve from the reference file information on the particular instructional design constructs of materials. Third, the significance of materials evaluation in meeting the goals of two different curriculum designs is discussed. A selected analysis of the literature and the major emphases in materials evaluation is presented.

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Instructional materials are essential ingredients in educational programs. Since perhaps 70 percent of a student's classroom work involves these materials, their influence outweighs the minor cost they impose on the school budget. Despite their significance, however, the systematic attention given them by researchers has been very limited compared with other classroom phenomena such as teaching strategies, student behavior, and environments.

The major study of instructional materials was completed 20 years ago and reflects the heavy emphasis on the textbook as the principal instructional material (3). Since that time, two lines of work have given attention to the selection of content and the instructional design of a variety of educational materials.

Analyzing Content

In the analysis of content, typically, the researcher compares the content against outside judgments of what is appropriate. For example, in a typical study, Brown (1) examined the scientific

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principles presented in selected junior high school science textbooks and made judgments, on the basis of research, on which principles should be taught in a three-year junior high school. Other examples of studies that have assessed subject content for inclusion have been done in conservation education (9), on Latin America (8), and on earth science (10). Over the past decade, it has become common to examine instructional materials for their portrayal of certain selected groups, minorities, and women. One variant of this analysis has been the examination of instructional materials for realistic depiction of urban life (2) and for use with inner city students (11).

The worth of content, its inclusion or exclusion, is a long-standing problem that has divided communities, politicized school boards, and brought great pressure to bear on superintendents and faculty. For an example of responsible criticism of content selection, see the Wall Street Journal, editorial July 21, 1975 on "MACOS and Moral Values." Irresponsible and ax-grinding criticism is easy to come by. (For numerous examples, see The Censors and the Schools by Jack Nelson and Gene Roberts Jr. Boston: Little, Brown & Co., 1963.)

Arguing the merits of content primarily selected on judgmental criteria set by professional opinion or an interpretation of community norms has not been a productive enterprise for instructional-materials selection committees.

Professional societies have given much attention to the problem of content selection and inclusion in numerous statements of recommendations. These recommendations have generally been used as guidelines by producers and selection committees. As a rule, the content recommended and included by producers does not run the danger of offending a core of widely accepted values and public moral standards.

Studying the Instructional Design of Materials

The second basic line of work has focused on the the instructional design characteristics of the materials (4, 13). A variant of the system developed by Eash and now used by the Educational Products Information Exchange in its nationally oriented evaluation system is described on page 3. Numerous field tests with practitioners (5) demonstrate the usefulness of the system for examining the instructional design of the materials for construct weaknesses, contradictions, and input required to make it an effective learning package and to teach users the intricacy of the instructional design within the materials, its purpose and learning thrust.

Our experience indicates that many learning packages are incomplete, inconsistent in their instructional design, and leave much to the ingenuity of the teacher. Producers who have expended considerable sums on the development of comprehensive instructional

design frequently find it not living up to their original promise due to the lack of mastery of the design by the user (6). For the proper use of materials, our experience at the Office of Evaluation Research at the University of Illinois at Chicago Circle strongly recommends that school systems hold materials evaluation workshops on new materials to preclude misuse of instructional materials and to instruct teachers in the accompanying instructional design. Moreover, in these workshops teachers become aware of the need for supplementing the instructional design if it is inadequately provisioned.

Four Constructs of Curriculum Design

The system for evaluating instructional materials is based upon four constructs of curriculum design: objectives, organization of materials (scope and sequence), methods of instruction, and evaluation. A number of components are examined under each of these constructs. The questions under each construct shown below are suggested for use as guides by practitioners in assessing instructional materials.

I. OBJECTIVES

- A. What is the nature of the general goals of the material stated?
- B. Are specific objectives stated for teacher use?
- C. If neither of the above are stated, list what you believe are the intended objectives of the material.
- D. What are the main emphases in the objectives?
- E. On the scale below, rate the objectives of the materials. Please place an "X" on an exact point.

Objectives not useful to a teacher.

1 2 3 4 5 6

Objectives give clear direction for instruction and useful for a teacher.

II. ORGANIZATION OF MATERIALS (SCOPE AND SEQUENCE)

- A. What is the scope of content covered in the materials?
- B. How is the scope of the materials organized?
- C. Is there a specified sequence in the material?
- D. What is the basis for the suggested sequence?
- E. On the scale below, rate the scope and sequence of the material. Please place an "X" on an exact point.

Scope inadequate, sequence not logical or incomplete.

1 2 3 4 5 6

Scope adequate for grade or group, sequence tasks carefully interrelated and planned.

III. METHODS OF INSTRUCTION

- A. What method or methods of instruction are suggested?
- B. What role is emphasized in the method: teacher, pupil, or both?
- C. What are the specific features of the method or methods recommended?
- D. Is the suggested method one that requires the teacher to do extensive prior preparation or participate in specific training?
- E. On the scale below, rate the methods of instruction. Please place an "X" on an exact point.

No methods suggested or implied that are helpful to a teacher.

1 2 3 4 5 6

Very carefully developed methods. Very useful to both teacher and pupil.

IV. EVALUATION

- A. What test materials are included for the student's and teacher's use?
- B. Are the test items adequate for informing a teacher of students' progress toward the instructional objectives set for the materials?
- C. What do the tests measure?
- D. Is there information on the tests' reliability and validity?
- E. Is there any information from the producer on how the materials were tested with students when they were being developed?
- F. On the scale below, rate the evaluation components of these materials and the evaluation of the materials by the producer as they were developed. Please place an "X" on an exact point.

No test materials or suggested checks on student learning included. No data on the evaluation of materials by the producer.

1 2 3 4 5 6

A wide range of test materials and evaluation suggestions. Evaluation data on field test conducted and materials included.

V. TOTAL RATING OF THE MATERIAL

- A. Draw up a brief statement on how these materials compare with those currently being used in your curriculum.
- B. On the scale below, rate overall potential effectiveness of these materials. Please place an "X" on an exact point.

Materials contain many weaknesses in instructional design. Difficult to use, expensive, inferior for learning.

1 2 3 4 5 6

Very strong in all areas of design. Strong potential to develop a wide variety of learnings. Of high interest to teachers and pupils. Very cost effective.

VI. CONSTRUCT RATING PROFILE

A. After completing the instrument, fill out the following profile for the evaluated material:

RATING

6
5
4
3
2
1

CONSTRUCT

I

II

III

IV

V

TABLE 1

A Profile of Two Mathematics Series

RATINGS

6
5
4
3
2
1

CONSTRUCTS

I

II

III

IV

V



..... = Series I

----- = Series II

Table 1 on page 5 is a profile of two mathematics series. As it shows, both series have their strengths and weaknesses, and if either should be adopted in use, the teacher would have to provision some of the constructs to make the series more adequate teaching tools. A school system may want to balance the strengths against these extra costs or it may decide the extra costs are worth absorbing to gain the strengths contained in the series. In any case, a far more rational basis exists for the selection of instructional materials, which is an advantage to both student and teacher as well as the producer.

Dissemination Network of Materials-Design Analysis

With well over 300,000 different instructional materials now on the market, each of which is competing for the carefully husbanded school funds available for acquisition of new materials, which are estimated at .97 of one percent of the total school budget (American School Board Journal, 1975), there must be a systematic way to analyze the design of instructional materials. No one school system or state department of education can tackle the task. Despite this, several states with textbook adoption laws now require some form of evaluation of materials that have been submitted for possible state adoption. Most school districts devise their own evaluation forms; on the school building level, the forms undergo further changes. Hence, information about instructional materials is collected in bits and pieces, filed away, and never exchanged with other schools whose personnel could be saved the time-consuming task of evaluating the same materials. Even if the information were exchanged, there is a language barrier, for there are no agreed-upon categories for selecting and coding the information for storing and sharing.

The instructional materials-design analysis instrument cited previously might serve a storage and sharing purpose. Underlying the instrument is a conceptual schema of curriculum design. Instructional materials selected for use in the educational program become the media through which the curriculum is translated into instruction. Therefore, understanding the design of the materials helps the decision maker select the materials that are appropriate for a given curriculum. If greater numbers of educators learn to use the materials-design analysis instrument, the selection process could avoid the usual difficulty of political pressure, publishers' flashy presentations, peer arm-twisting, and subjective decision making.

This section reports on a national effort to establish a common language of materials-design analysis and to share the data on a wide scale. The Educational Products Information Exchange Institute (EPIE), a nonprofit organization, was established in 1967 under a charter (7) by the Regents of the University of the State of New York:

The purpose of EPIE Institute is to provide its members with

information and counsel based on impartial, independent studies of availability, use and effectiveness of educational materials, equipment, and systems. All EPIE's services are designed to facilitate the making of informed rational evaluations of specific products by the educational consumer.

EPIE uses an adapted form of the Eash instrument to analyze materials and presents the results in the EPIE publication EPIE Reports. At first, only a handful of evaluators knew how to apply the constructs to design analysis. Under EPIE's direction and through the sponsorship of state departments of education and local regional educational offices, personnel in key materials-selection positions participated in two-and-one-half-day training sessions on materials-design analysis and a day-long follow-up session one month later. This was the first step beyond publication of the EPIE Reports to introduce educators to a common analysis schema, and the first effort to make the instructional materials-design analysis instrument a feasible format for school personnel to use in their own materials evaluation tasks. To date, educators in states across the country and in Canada have completed the training and are qualified as analyzers. The analyzers send EPIE a copy of their analyses. These are synthesized and become part of the common data bank for disseminating information about instructional materials through the EPIE Reports. In the course of the training sessions, the initial instrument has undergone several changes to make it responsive to the kinds of data most meaningful to the users. Training sessions have been conducted in the states of Pennsylvania, Connecticut, New Jersey, Florida, California, New Mexico, New York, Texas, and in Canada.

As a next step in establishing a dissemination network, EPIE organized a task force. Through the employment of the task force concept, EPIE obtained systematic data in selected content areas to share with a wide audience. The latest task force devoted to analyzing current elementary mathematics series assembled for five days. The team consisted of EPIE-trained analyzers from state departments of education, school systems, a special group of mathematics educators selected by the National Council of Mathematics Teachers (who underwent EPIE materials-design analysis training), and EPIE staff and materials-evaluation consultants. Current mathematics series from the major publishers were analyzed. The series were analyzed independently by an educational generalist and a mathematics educator using the latest version of the EPIE form for analyzing instructional materials. These independent analyses were synthesized by an EPIE staff member or the evaluation consultant.

The information is now being disseminated in an EPIE Report. School personnel across the country have available analyses of nearly two dozen major mathematics series, described in a common language, that can be compared with each other. Instructional materials-selection decisions can now be predicated on the "best

fit," that is, selecting the mathematics series whose design best fits the school system's mathematics curriculum or its philosophy of mathematical education. Task forces have also been organized for analyzing extant reading and social studies texts that have been reported in past issues of the EPIE Report.

The use of a common language to describe the design features of instructional materials is used as a form of communicating complex concepts in operational terms understood by an ever-increasing group of educational decision makers. Where EPIE Reports describing a textbook series formerly covered eight to a dozen pages, analyses are now compressed into two EPIE Report pages. Expository statements are reduced to operational descriptors.

Plans in the immediate future include coding the descriptors for computer storage. As greater numbers of analysts throughout the country send their reports to EPIE, the analyses can be synthesized and the descriptors coded and stored. Upon request, educators will be able to obtain from EPIE computer printouts of instructional materials design analyses. In the future, school personnel can ask for information about specific materials, materials in a given subject area, or materials having certain design features.

Analysis of the design of instructional materials does not remove from school personnel the final responsibility of evaluating and selecting materials. Evaluation becomes a "best fit" task. Educators must understand their own curriculum and fit the design of the materials to their curriculum designs.

Materials Evaluation in Individually Guided Education and Open Education

Materials evaluation is particularly important in the very recent curriculum designs called Individually Guided Education (IGE) and Open Education, which represent, respectively, a behaviorally oriented system and a humanistically oriented plan (6 and 14).

Individually Guided Education, developed by the University of Wisconsin Research and Development Center for Cognitive Learning, is a system of organizing the school program to make it more responsive to the needs of individual children. Based on a model of instructional programming for the individual child, criterion-referenced tests, and observation schedules, IGE calls for the assessment of each child's entry skills, use of a management plan for grouping and instructing children, and a plan for monitoring each child's progress. However appealing though the model may be, the IGE materials for students are not at all extensive, and many are still being field tested. Consequently, the school staff must select and use commercially available materials that are judged congruent with, or adaptable to, IGE goals and procedures. Thus, IGE teachers - especially those just starting the program (as many are now doing around the country) - must be materials evaluators and

highly aware of such design constructs as scope and sequence that determine the compatibility of sets of materials with one another and with the ICE system.

Open Education, especially in its more authentic, original form, puts an even greater burden on the materials-evaluation skills of the teacher who, with her students, jointly selects or fashions the materials of learning. Class sets of texts are avoided, and the book most suitable for a particular child at a particular time is selected. In many cases, a book written by one child is studied by another. In other instances, a child may read and discuss his or her writing with other interested children. Similarly, the teacher and children bring in natural materials for scientific study or craft materials that serve as the basis of lessons.

In traditional education, adherence to a reading series and comparable media would insure appropriate coverage, sequence, difficulty, and other design constructs. In Open Education, these responsibilities fall on the teacher and child; obviously, awareness of the design issues mentioned in the previous sections are critical not only for classroom success but also for explaining purposes and procedures to parents.

Conclusions

Changing curriculum designs put ever greater pressure on staff and teachers to be knowledgeable about the quality and potential of the design of instructional materials. Increasingly, the teacher becomes a key figure in an instructional management system in which materials have a specific, as opposed to a general, function. To bring to fruition the promising trends in curriculum design described in this paper will require an in-depth knowledge of materials. Some limited assistance is becoming available nationally, but the primary responsibility rests with the faculty in the local school unit. The instrument presented in this paper is one approach to meeting the need for assessment of the instructional design of materials and the promotion of in-service education for improved use of materials.

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